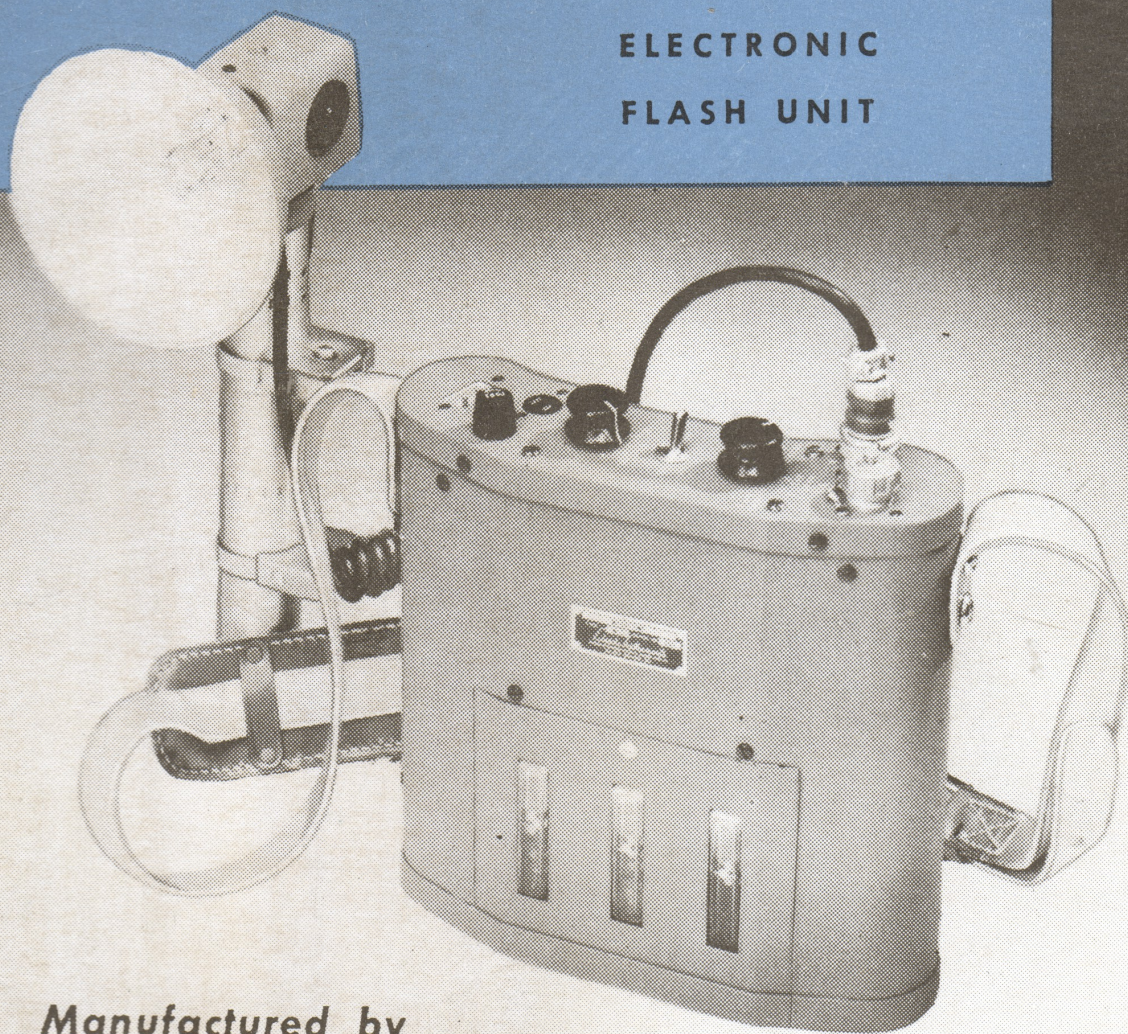


INSTRUCTION BOOK

for the

Megalume 2®

FINEST PORTABLE
ELECTRONIC
FLASH UNIT



Manufactured by

Clarke Instruments

DIVISION OF

NATIONAL ELECTRICAL MACHINE SHOPS, INC.
919 JESUP BLAIR DRIVE, SILVER SPRING, MD.



W A R N I N G !

Postal Regulations prohibit the shipment of batteries containing acid through the mail without extensive precautionary packing.

If, for any reason, the Megalume II must be returned to the factory, remove and retain the battery.

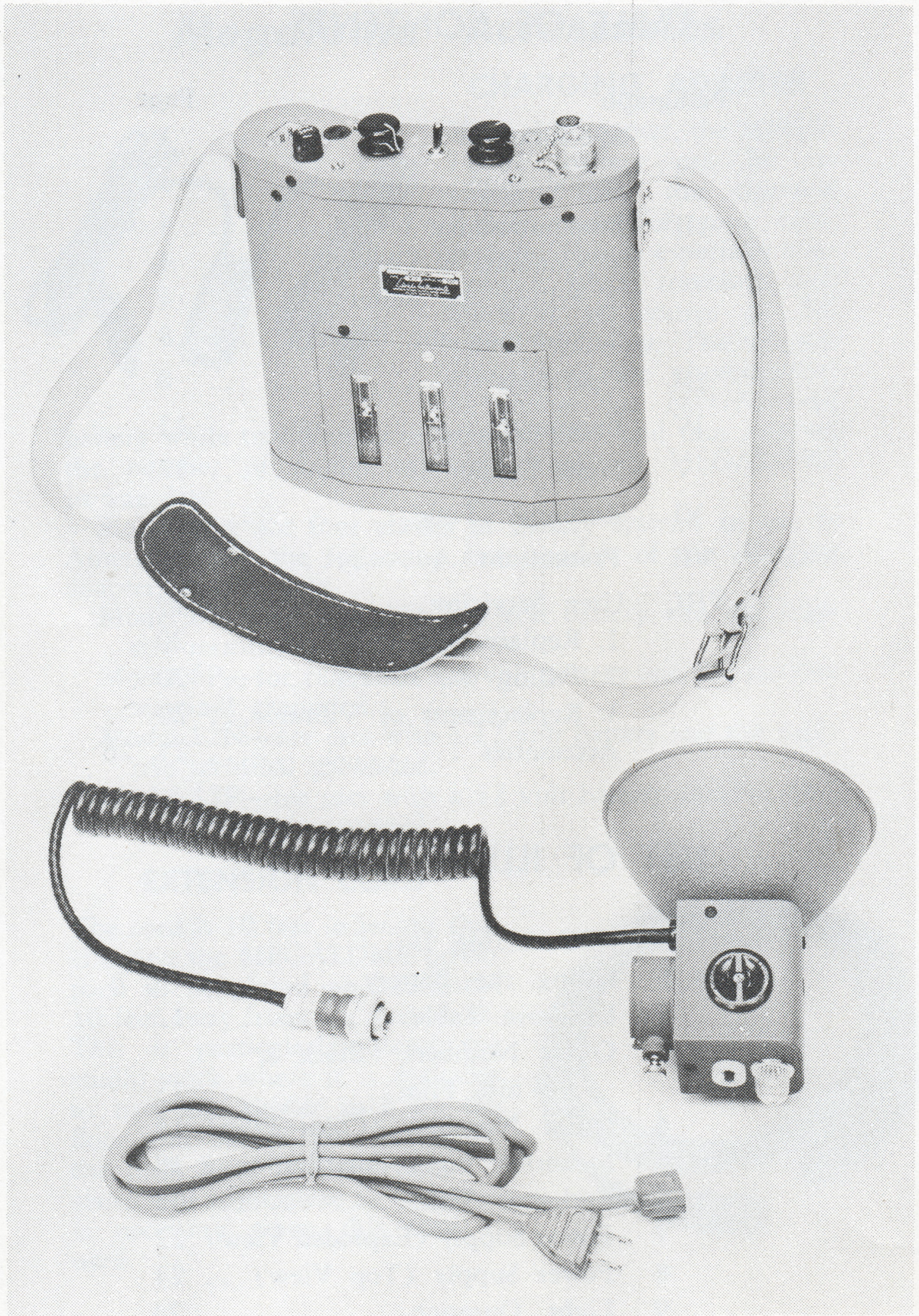
The manufacturer assumes no liability for any damage caused by the shipment of a Megalume II with battery.

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MEGALUME II

SPECIFICATIONS

COMPLETE EQUIPMENT

- (1) Power unit with leather carrying strap
- (2) Flash head with connecting cable
- (3) Power cord
- (4) Battery, Willard Type ER-6-6B
- (5) Battery solution, 8 oz. bottle,
1,280 specific gravity, with battery filler
- (6) Instruction book

SHOULDER WEIGHT

With battery installed for portable

operation.....11 lbs. 4 oz.

TOTAL WEIGHT

Including flash head.....12 lbs. 8 oz.

OVER-ALL SIZE

Height.....11 in.

Width.....10 $\frac{1}{4}$ in.

Thickness.....3 in.

POWER SUPPLY

- (1) 6-volt storage battery
- (2) 117-volt A.C., 50 to 60 cycles

A-C POWER REQUIREMENTS

- (1) Peak.....70 watts
- (2) Stand-by.....Less than 10 watts
- (3) Charge.....Less than 10 watts

ENERGY STORAGE.....100 or 200 watt
seconds

RECHARGE TIME

- (1) 100 watt-seconds position;
A-C and D-C operation.
 - (a) Within 1 F stop of full
charge.....4 seconds, approx.
 - (b) Within $\frac{1}{2}$ F stop of full
charge.....6 seconds, approx.
- (2) 200 watt-seconds position;
A-C and D-C operation
 - (a) Within 1 F stop of full
charge.....7 seconds, approx.
 - (b) Within $\frac{1}{2}$ F stop of full
charge.....10 seconds approx.

SPECIFICATIONS (Continued)

LIGHT OUTPUT, MINIMUM

Measured with Type 1501-A General Radio Integrating
Light Meter

- (1) 100 w/s po-
sition 190 lumen seconds per sq. ft. at 4 ft.
3000 beam candle power seconds
- (2) 200 w/s po-
sition 400 lumen seconds per sq. ft. at 4 ft.
6400 beam candle power seconds

I

Introduction

The MEGALUME II is an electronic photoflash unit built to the highest possible standards. It is produced by a company with more than 40 years' experience in the manufacture of the highest-quality electronic and communications equipment for use by the Armed Services.

In the design of the unit, the only considerations were quality and performance, and no compromises were made for the sake of making the unit competitive in a price market. Careful consideration has been given to all of the engineering aspects of design so necessary for long life and user satisfaction.

This instruction book is in two parts. The first part is confined wholly to operating instructions. The second portion of the book has to do with such servicing as the average user may want to take care of himself.

II. PREPARATION FOR USE

1. CONTENTS OF CARTON.—One each of the following items will be found in the carton when it is opened:

- Flash head with connecting cable
- Power pack
- AC power cord
- Storage battery
- Instruction book

2. FILLING THE BATTERY. Your dealer has available already mixed battery solution, supplied to him with his purchase of the MEGALUME II, but shipped separately.

The first step in preparing the instrument for use is to fill the storage battery with the solution provided. Usually your dealer will be glad to do this for you. If, however, this is impossible for some reason, it can easily be done by you. Follow the step-by-step filling instructions.

a. Using a screwdriver, operate the flush catch on the battery compartment by turning it one-quarter turn counter-clockwise. Open the battery compartment door. (*Fig. 1*)

b. Remove the battery from the battery compartment and remove and destroy the seals which cover the vent openings. (*Fig. 1-A*)

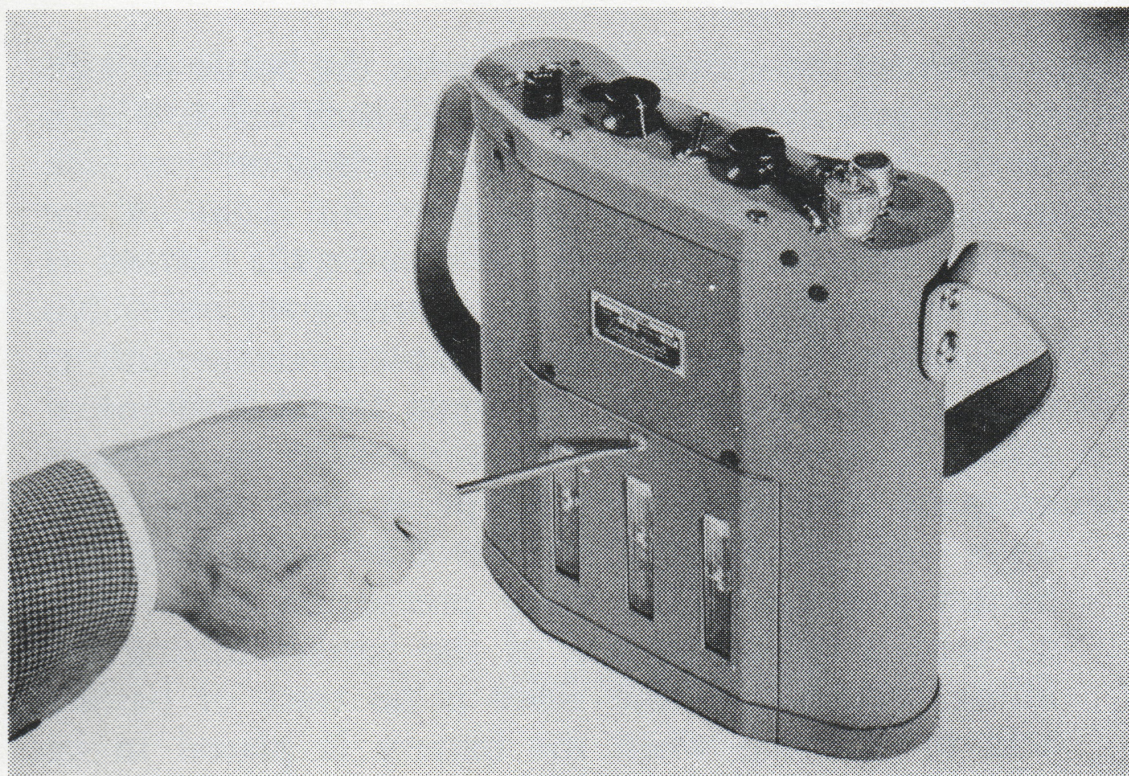


FIGURE 1

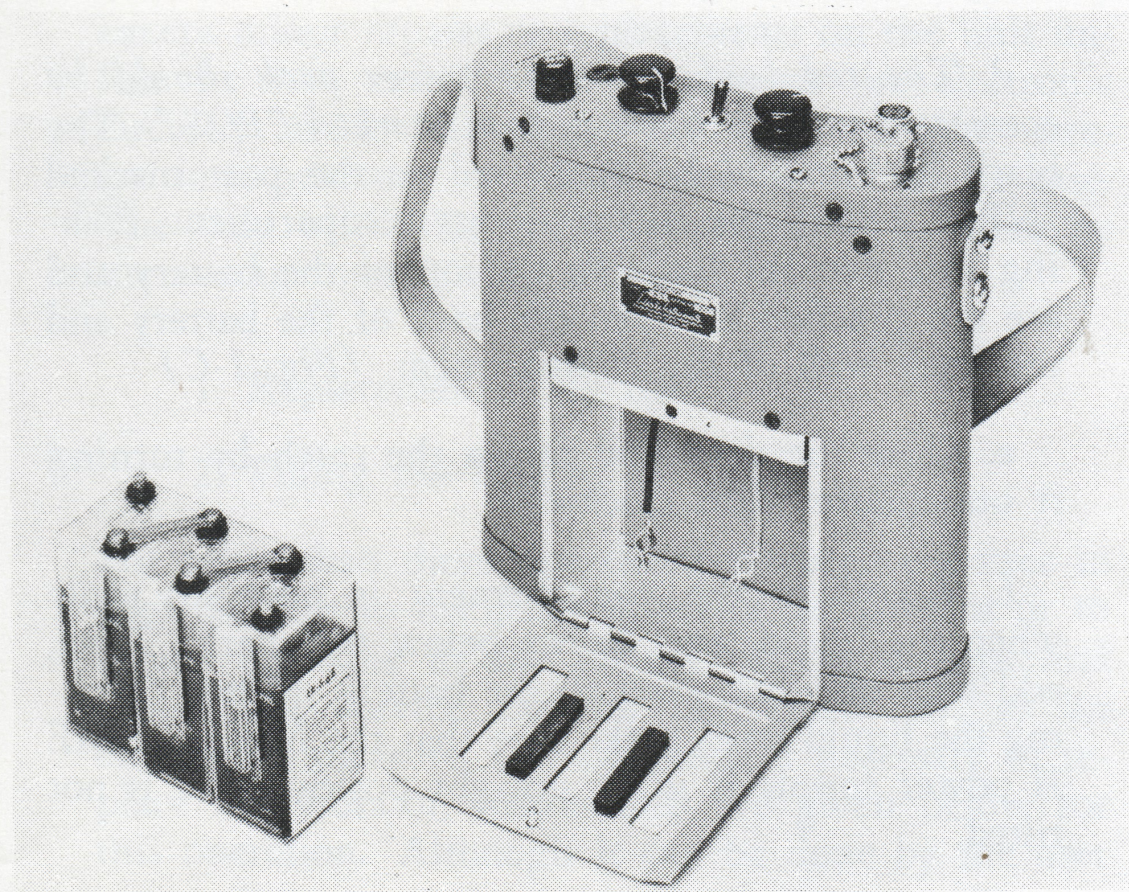


FIGURE 1-A

c. Using the syringe packed with the bottle of 1.28 specific gravity battery solution, fill each cell $1/8$ inch above the "Liquid Level" line marked on the side of the battery case. *Be sure that the spout on the syringe is inserted through the hole in the bottom of the trap compartment before squeezing the bulb.* No liquid should be in the trap. The plates and separators of the battery will soak up some liquid, and initial filling about $1/8$ inch above the line will insure adequate level after this absorption takes place. Observe the precautions on the box containing the battery solution. Take every precaution to see that no acid is spilled on top of the battery during the filling process and that there is no trace of battery acid on the top when the battery is placed in its compartment. (Fig. 1-B)

d. *The red lead from the power pack should be connected to the battery post marked "POS."* The black lead should be connected to the post marked "NEG". Place the battery in its compartment, making sure that the leads lie on top of the battery and are not pinched between the back of the battery and the back wall of the compartment. (Fig. 1-C)

e. Close the door and fasten the catch by turning it one-quarter turn clockwise.

f. Access to the compartment is necessary only when the liquid level shows below the mark. Then, add only distilled water to the battery. When checking the liquid level, make sure that the MEGALUME II power supply is in an upright position and is not tilted.

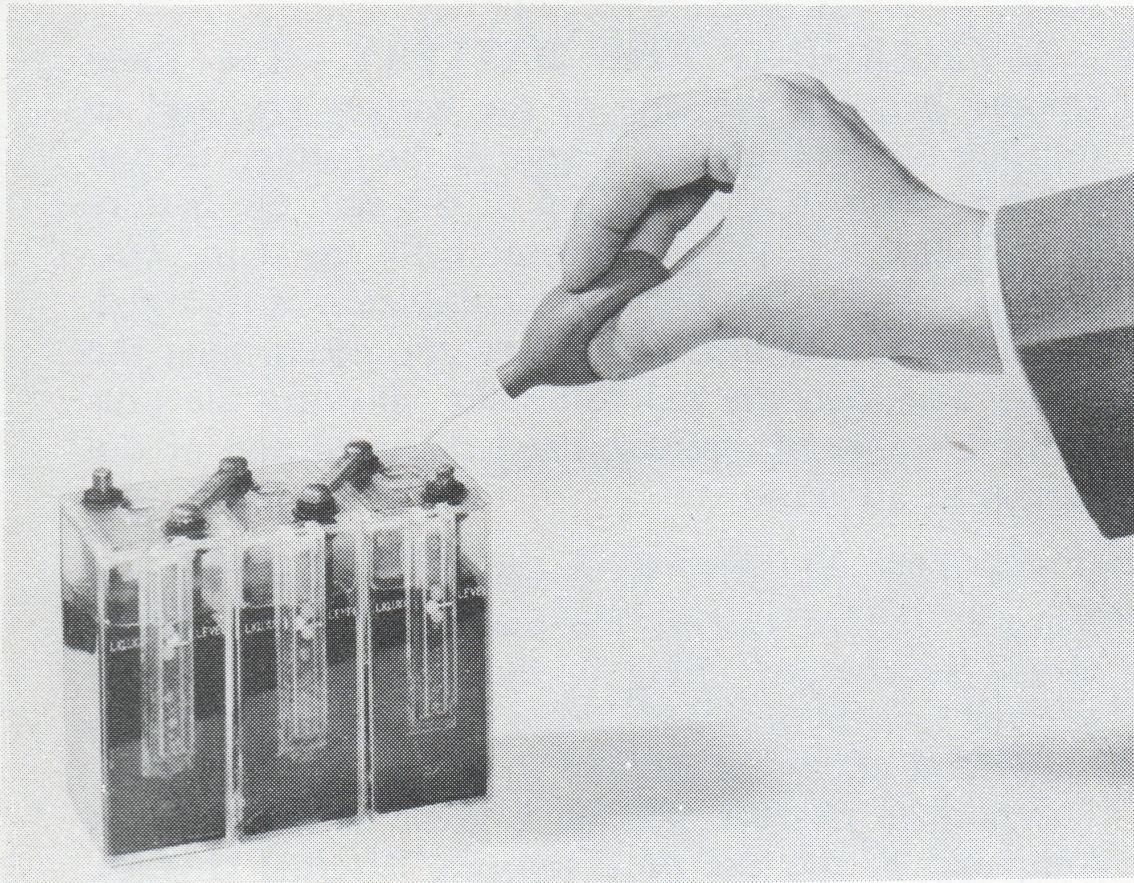


FIGURE 1-B

*The red lead from
the power pack
should be connected
to the battery post
marked "POS."*

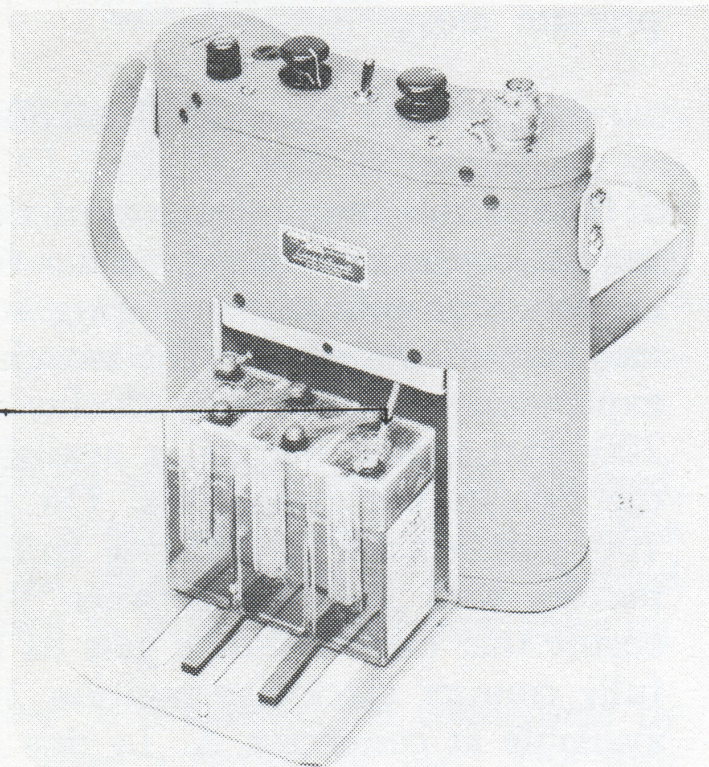


FIGURE 1-C

3. CHARGING THE BATTERY.—The three colored balls on the side of the battery are used to indicate the condition of charge of the battery. When all three balls float at the top of the slot, the battery is fully charged. When all three balls are at the bottom of the slot, the battery is completely discharged. As the battery is discharged, first the green, then the white, and then the red ball sinks, showing the progressive stages of discharge and the condition of the battery at all times.

The MEGALUME II contains its own battery charger. *Before putting the unit to use, the battery should be charged.* Plug in the a-c cord, throw the selector switch to "CHG." and the toggle switch to "ON" and allow the battery to charge for 20 hours. The built-in charger will be a great convenience as compared to the use of a separate external charger, and is one of the features MEGALUME II users appreciate most.

III. OPERATION

One of the unique features of the unit is a switching arrangement which provides for a choice of any one of three different operating conditions from the two output connectors. The switch markings are self-explanatory. On the fully clockwise position the full 200 watt-second output is available from either of the two output connectors. On the center position 100 watt-seconds is available from each of the connectors with isolation between the two outputs to ensure that each flashtube gets its full energy. In the fully counter clockwise position 100 watt-seconds is available at connector A. In this latter position one

bank of condensers is disconnected, and the current drawn from the storage battery is reduced to an absolute minimum.

Patents are pending on the switch arrangement necessary to provide this degree of flexibility.

After charging the battery the next step is to reform the condensers in the MEGALUME II since after a period of idleness peak light output cannot be obtained for the first few flashes. To insure peak light output on the first use and to avoid using the battery during the reforming operation follow the procedure below:

1. Connect the flash head to the power supply by screwing together the mating parts of the connector.
2. Set up the unit for a-c operation by connecting the a-c cord to the unit and to an a-c source. Turn function selector switch (*Fig. 8*) to "A.C."
3. Turn the output switch (*Fig. 8*) to the center (dual 100 W.S. output) position. Turn the off-on switch to "ON".

The lamp on the rear of the flash head will now begin flashing indicating the unit is functioning properly. Permit the unit to operate in this manner for a period of 30 minutes flashing the head occasionally by pressing the red button on the back of the flash head to expedite the reforming process. If two heads are available they should both be connected and flashed.

If the unit is idle for a period in excess of one month it will be necessary to repeat this reforming process. One to two weeks of idleness will need 10 to 15 minutes of reformation.

The markings around the function selector switch (*Fig. 8*) on top of the power supply are fully descriptive. On "CHG." the battery is being charged. It is, of course, necessary to have the a-c cord connected. On the position marked "A.C." the unit is ready to operate from a 110-120 volt a-c power supply when the a-c cord is connected. On "BAT" the MEGALUME operates from its own internal six-volt storage battery. The switch marked "ON-OFF" functions as marked for each of the three positions of the selector switch. For example, when charging the battery, the switch must be in the "ON" position. The switch should be in the "OFF" position whenever the unit is not being used. This is particularly important to conserve energy when battery operation is employed.

No cable is supplied with the MEGALUME II to connect the flash head to the user's camera, because of the lack of standardization of connectors used for this purpose. Your photographic dealer carries in stock connecting cables to fit your particular camera, and the cable should be procured from him. If you have been using one of the standard types of flash equipment using bulbs, you may find that your present cable is adequate, since the receptacle on the MEGALUME II head is standard.

The MEGALUME flash head is designed to fit on any 1½" diameter tube. This size is standard with most manufacturers of flash equipment designed for use with flashbulbs. The old reflector should be removed and the MEGALUME head placed in position. If your camera has a solenoid-operated shutter, you can either leave the normal photoflash batteries in the battery case and use them to operate the shut-

ter, or you can make use of another of the MEGALUME's features. The connector marked "BAT.", on top of the power supply case, makes available six volts at a high discharge rate, which can be used to operate your solenoid. On flashgun tubes which have a side outlet normally used to supply a focus spot, it is only necessary to connect a special cable, available from your dealer, between this outlet and the "BAT." outlet on top of the MEGALUME power supply case. In doing this, always make all outside connections *before* inserting the plug in the "BAT." receptacle on the power supply. With this arrangement, assuming a solenoid-operated shutter having internal (X) contacts, all the convenience of operation usually found on press cameras is retained, and the photographer has nothing new to learn. He simply pushes the switch that he is accustomed to use, the solenoid is tripped, and the shutter contacts set off the MEGALUME II flash.

For camera owners who do not have a flashgun employing a battery holder having the required 1½" diameter, there is available from your dealer a universal mounting bracket and tube which will enable the MEGALUME flash head to be attached to virtually any camera.

IV. EXPOSURE

Assuming that you are ready to go, the next step is to determine what exposure guide numbers you should use. The following table (fig. 2) is conservative and is based on extensive sensitometric tests. Tests to determine what, if any, exposure and

EXPOSURE TABLE

(Figure 2)

Type	Daylight Speed	Guide No. (See Note 1)	
		100 w/s Position	200 w/s Position
<i>Color Films:</i>			
ANSCO			
AnSCO color	10	45	68
EASTMAN	See	See	See
Ektachrome	8 (Note 2)	40 (Note 2)	60 (Note 2)
Kodachrome	10	45	68
Kodacolor	25	70	105
<i>Black and White Films:</i>			
ANSCO			
Isopan	50	120	180
Supreme	50	120	180
Superpan Press	125	190	285
DUPONT			
High Speed Pan			
Type 428	160	215	325
Arrow Pan	160	215	325
X-F Pan	64	135	200
Fine Grain Pan	32	96	144
EASTMAN			
Royal Pan	200	240	360
Super Panchro Press			
Type B	125	190	285
Super XX	100	170	255
Plus X	50	120	180
Portrait Pan	50	120	180
Panatomic X	32	96	144
Infrared (standard type) with No. 25, 29, or 70 filter			
	20 (tungsten)	60	90
POLAROID			
Type 41	100	140	220

Note 1: Based on test limit minimum for light output. The higher light output of the average unit will permit a 10% higher guide number.

Note 2: This value should be modified according to instructions packed with the film.

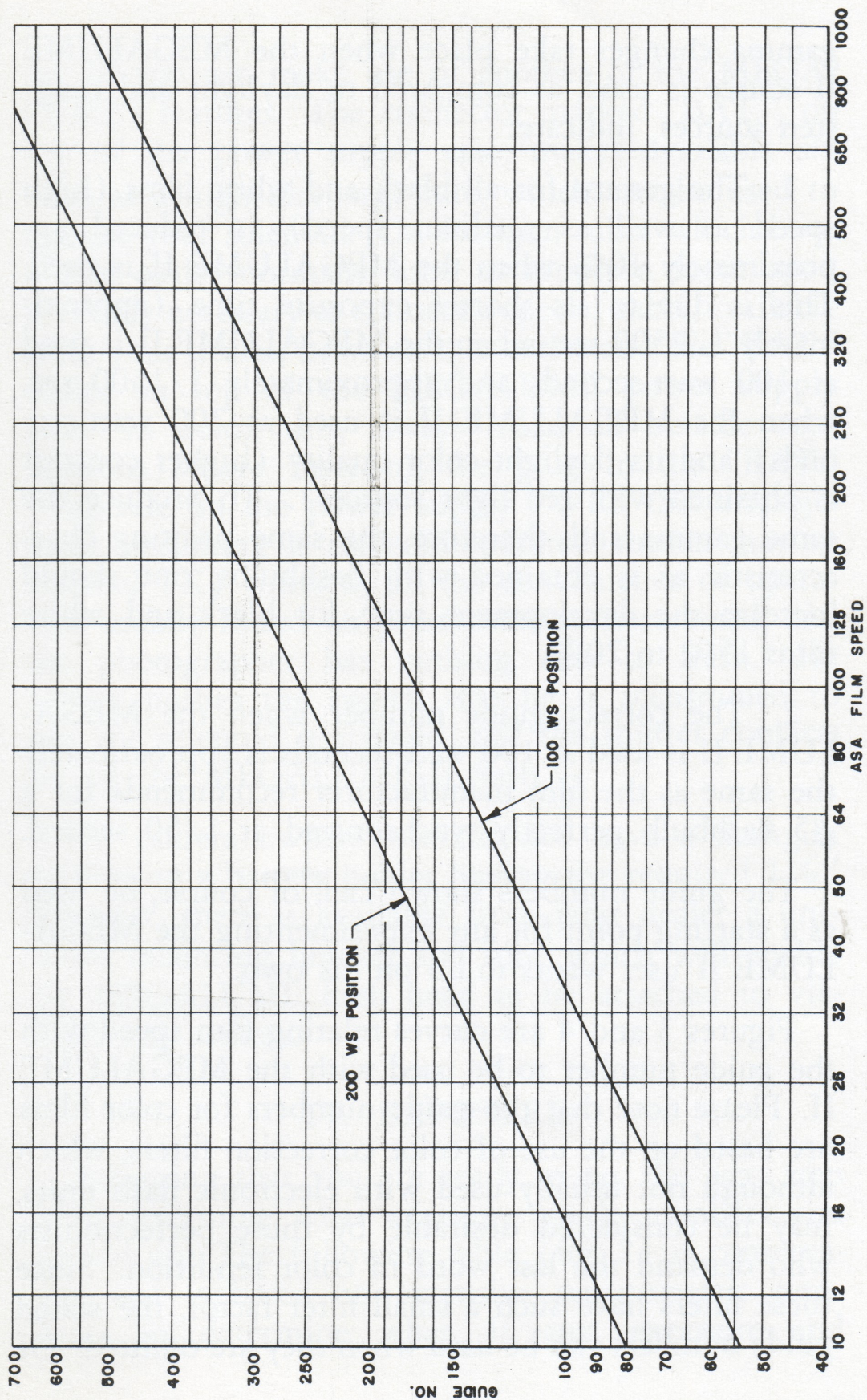


FIGURE 3 -BLACK & WHITE GUIDE NUMBERS FOR USE WITH THE MEGALUME II

gamma changes take place when the MEGALUME II source is used, as compared to daylight and tungsten sources, indicate:

1. The gamma for all black and white films (high speed as well as medium speed) is reduced approximately 10% when the MEGALUME II is used. This is due to its shorter exposure time (approximately 1/2500 sec. when the MEGALUME II is used at 100 watt-seconds and approximately 1/1500 sec. when the MEGALUME II is used at 200 watt-seconds) and its daylight color quality (higher contrast is obtained with red light sources). To produce the same gamma and, therefore, the same printing characteristic as is obtained with flashbulbs, one should increase the development time for black and white films 15% to 20%.

2. The correct guide number when the MEGALUME II is used at 100 watt-seconds is approximately the same as the film manufacturer recommends for a #5 flashbulb perfectly synchronized at 1/50 second.

The guide numbers shown can, of course, be used as a starting point for any experimenting the MEGALUME II user wants to do on his own.

Figures 3 and 4 are curves relating film speed with the guide number to be used with the MEGALUME II. Please note that the guide numbers for color films are based on the use of color correction filters, which although not usually used with electronic flash units, may be considered desirable by those perfectionists who demand the last word in color rendition. Since these filters have such a small filter factor, the stated guide numbers can be used when they are omitted. Of

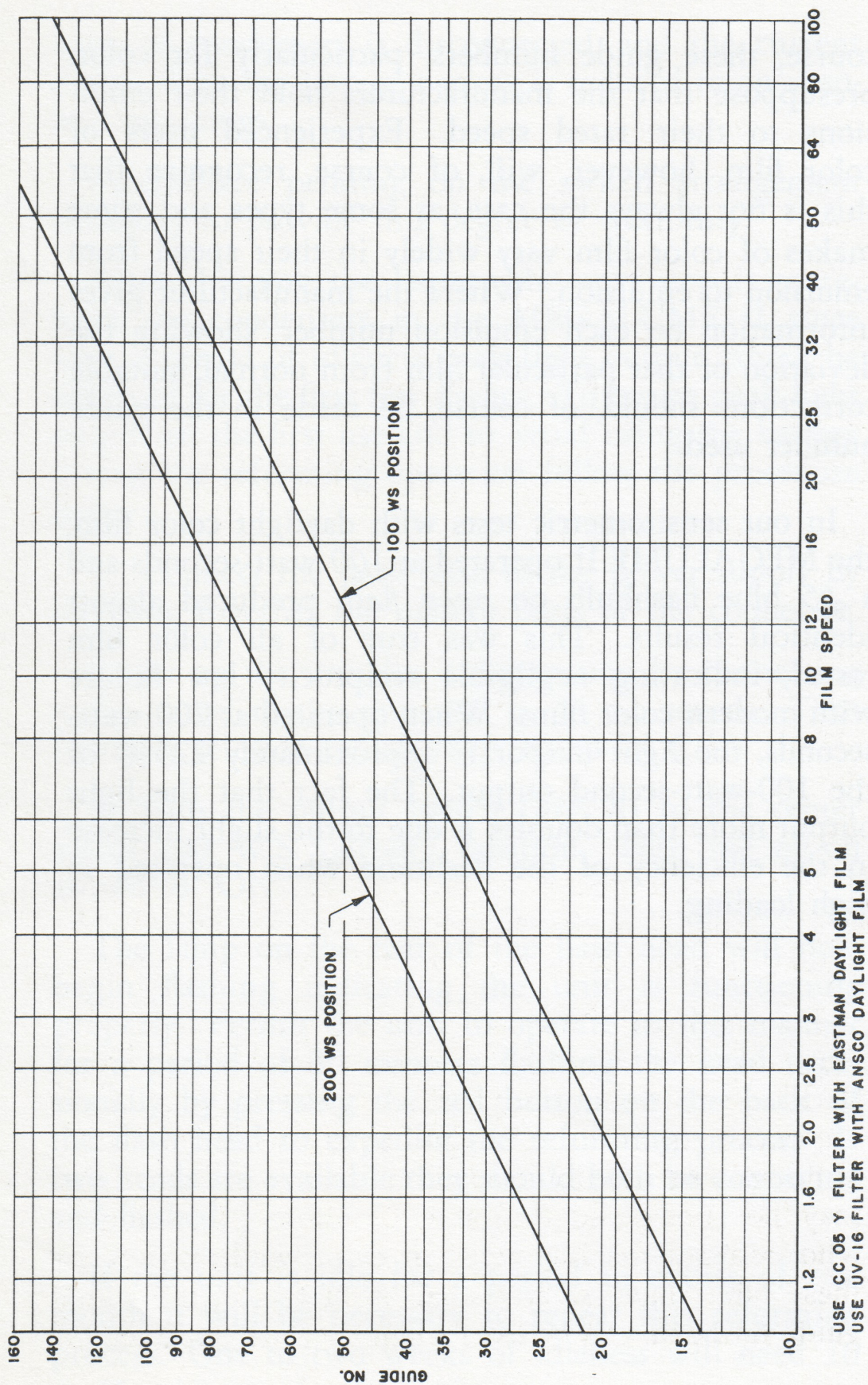


FIGURE 4 - DAYLIGHT COLOR FILM GUIDE NUMBERS FOR USE WITH THE MEGALUME II

course, these guide numbers, particularly for color, presuppose that the manufacturers hold their emulsions to their rated speed. Experienced users of color film, however, will, of course, recognize that this is not always the case, as some types and some makes of color film vary widely in their speed from emulsion to emulsion. Where the manufacturer gives information on each emulsion number, showing the deviation of that particular film from normal, suitable corrections should, of course, be made in the guide number used.

In our sensitometric tests with daylight color film, the MEGALUME II operated at 100 watt-seconds and a #5 blue flashbulb on *open flash* produced almost identical results. This was true of all color film tested, indicating negligible reciprocity law failure with modern color films. When operated at 200 watt-seconds, the light output is approximately 225% of the 100-watt-second output. The fact that the light output more than doubles is due to the slight increase in the efficiency of the flashtube when operated at high loading.

V. LIGHT OUTPUT

The light output, in lumen seconds per square foot at 4 feet, of every MEGALUME II is accurately measured at the final inspection position in three directions: Head on, and 25 degrees each side of center. Fig. 5 is a plot of the directivity of the MEGALUME II reflector.

VI. RECHARGE TIME

When operated on either AC or batteries, the MEGALUME II recharges in the following time periods.

100 watt-second operation: 4 seconds to within 1 F stop of full charge; 6 seconds to within $\frac{1}{2}$ stop.

200 watt-second operation: 7 seconds to within 1 F stop of full charge; 10 seconds to within $\frac{1}{2}$ F stop.

VII. PRECAUTIONS

If operated at temperatures below freezing, the output of the MEGALUME II will be materially reduced. This reduction in output occurs only if the entire unit has become chilled to below freezing. It obviously does not apply if the unit is taken outdoors for a short period of time from a warm location.

The batteries should always be kept fully charged, even when the unit is not being used regularly. The battery must, by all means, be kept fully charged if the unit is exposed to temperatures below freezing.

It is not desirable to discharge the condensers by flashing the lamp after a period of use. The unit.

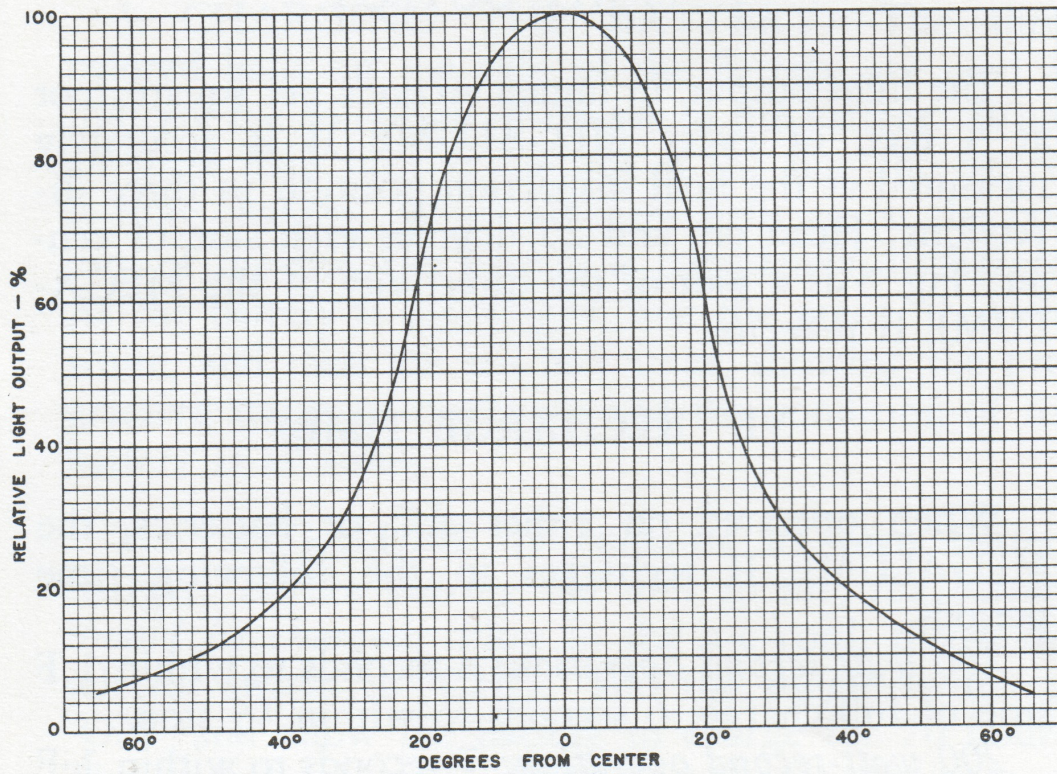


FIGURE 5 - MEASURED LIGHT DISTRIBUTION FOR MEGALUME II

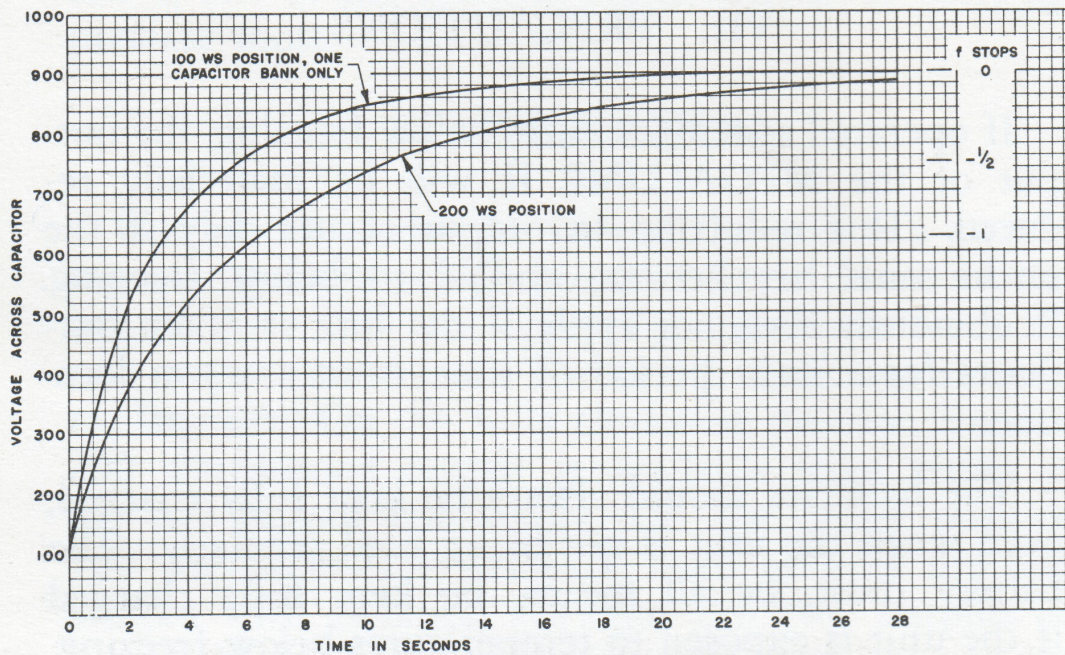


FIGURE 6 - RECHARGE TIME CURVES FOR MEGALUME II
(AC OR BATTERY OPERATION)

should be put on the shelf with the batteries fully charged and the condensers charged, ready for use. The condenser charge will gradually leak off when the unit is not being used. If the unit is kept inactive for any long period of time, it is desirable to charge up the condensers occasionally. After a period of prolonged idleness, the unit should be operated for a period of at least ten minutes before flashing in order to allow the condensers plenty of time to reform. Failure to do this will result in reduced light output for the first few flashes.

VIII. USER SERVICING

It is not recommended that the user make any except minor repairs or replacements on the unit unless he has considerable experience in electronic circuitry and is fully conversant with the safety precautions necessary when the unit is out of its case. The only work that we recommend to be done by the average user is the following:

1. Replacement of the fuse.
2. Filling the battery.

For other than these operations we urge the user to take the unit to his dealer's service department or to return the unit to the factory, where prompt and economical service can be performed. If, as an emergency measure, the user finds it necessary to replace the vibrator, instructions are given below for this operation. Although it can be done by the user

if the precautions stated are followed, we recommend that you let your dealer or service man do it if his service is available.

1. REPLACEMENT OF THE FUSE.—Fuses are not ordinarily provided on photoflash equipment. However, some instances have been reported where users have tried to operate the instrument or charge the battery when connected to a direct-current outlet. If the MEGALUME II is used on any but the proper circuit, the fuse will blow. The fuse can be replaced simply by pressing down on the black top and turning in the direction of the arrow, then lifting out the fuse after the bayonet lock becomes disengaged. The replacement fuse should be a .5 ampere (slow blow) type, available at any radio supply dealer. A new fuse is inserted by pushing down on the cap and turning in the direction opposite to the arrow.

2. FILLING THE BATTERY.—The liquid level in the battery should be kept to the lines shown by the addition of distilled water. Use the small syringe furnished with the battery for this purpose. Refer to page 4 for detailed battery filling procedure.

3. REPLACEMENT OF THE VIBRATOR. The vibrator used is a Type 659 or 859 Mallory unit. The normal source for these units is your nearest radio supply store. In case this vibrator cannot be readily obtained, the following types can be used as emergency replacements:

Cornell-Dubilier 5301

ATR 340

Radiart 5301

James J2SP

To replace the vibrator it is necessary to go inside the unit. It is important that before any work is done on the interior of the unit, the condensers be fully discharged. If the unit has been turned off for at least one hour, the condensers will, in all probability, be discharged. If it is inconvenient to leave the unit off for this period of time, it should be switched to AC operation and the condensers charged; and then with the AC plug removed and the switch in the OFF position, the unit should be flashed to discharge the condensers. After the unit has been flashed, there still remains a residual charge in the condensers, which will be dissipated in approximately 15 minutes' time. After the above precautions have been taken, proceed as follows:

- a. Open the battery door, take out the battery, and disconnect the wires from its terminals.
- b. Make sure the AC cord is disconnected from the unit and that the switch is in the "OFF" position.
- c. Wait at least 10 minutes before opening the unit.
- d. Remove the four screws holding the top on the power supply and lift the top up with a slow, even pull. *DO NOT TOUCH ANY EXPOSED PART OF THE WIRING OR COMPONENTS.* Do not jerk. The vibrator is readily accessible and may be easily removed and replaced.
- e. Replace the top of the unit and reconnect the battery.

Power Supply (Exploded View)

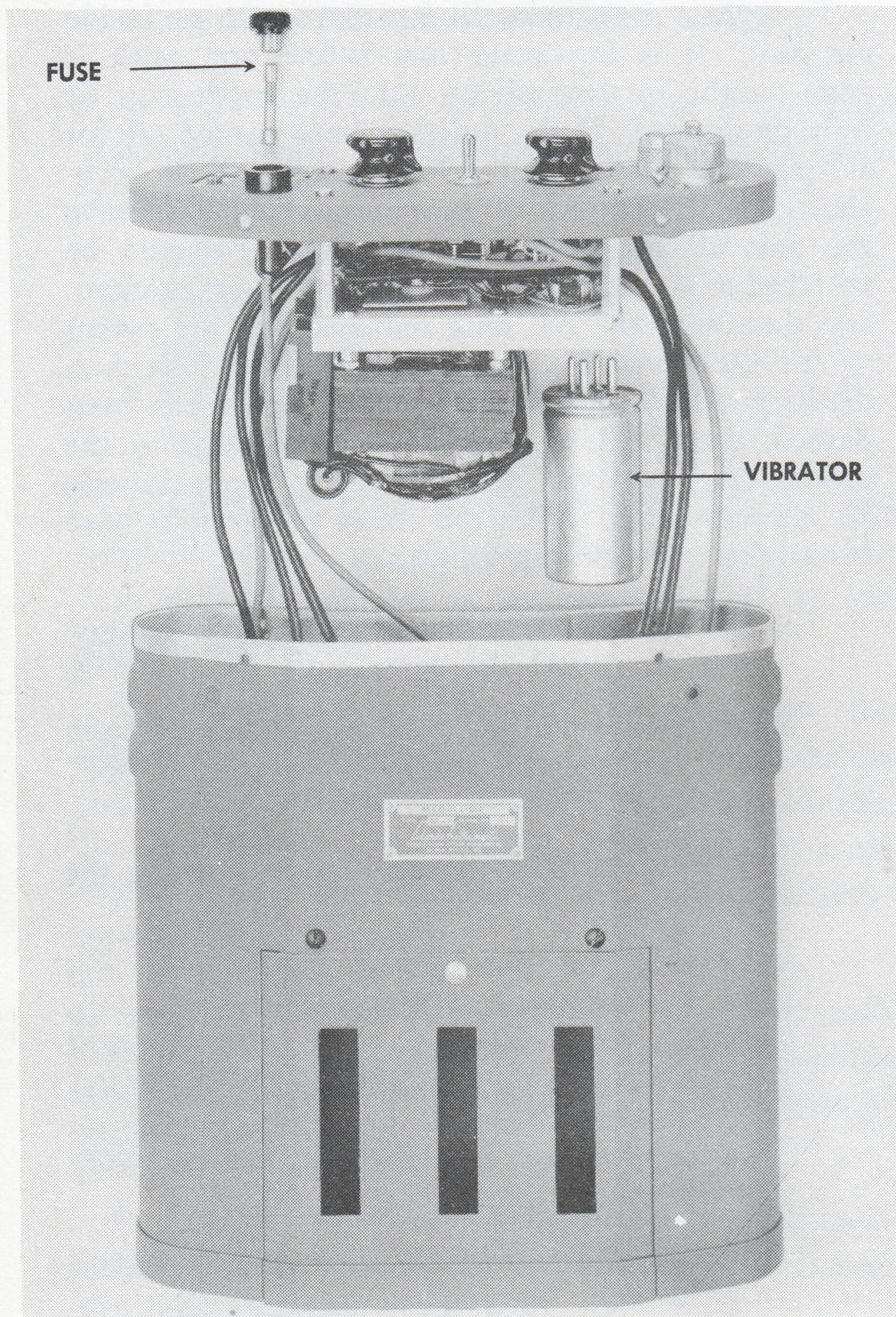


FIGURE 7

Power Supply (Top View)

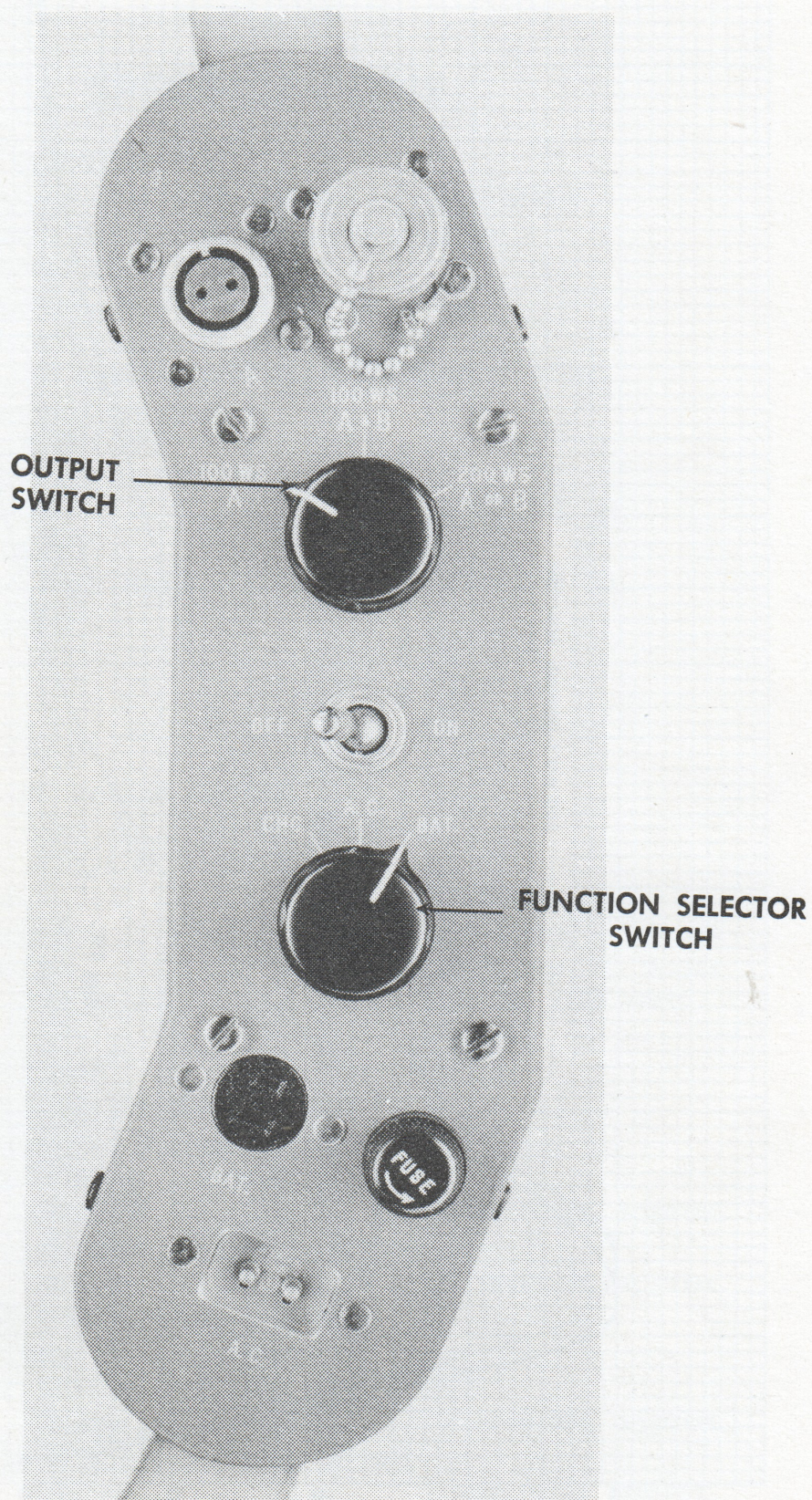


FIGURE 8

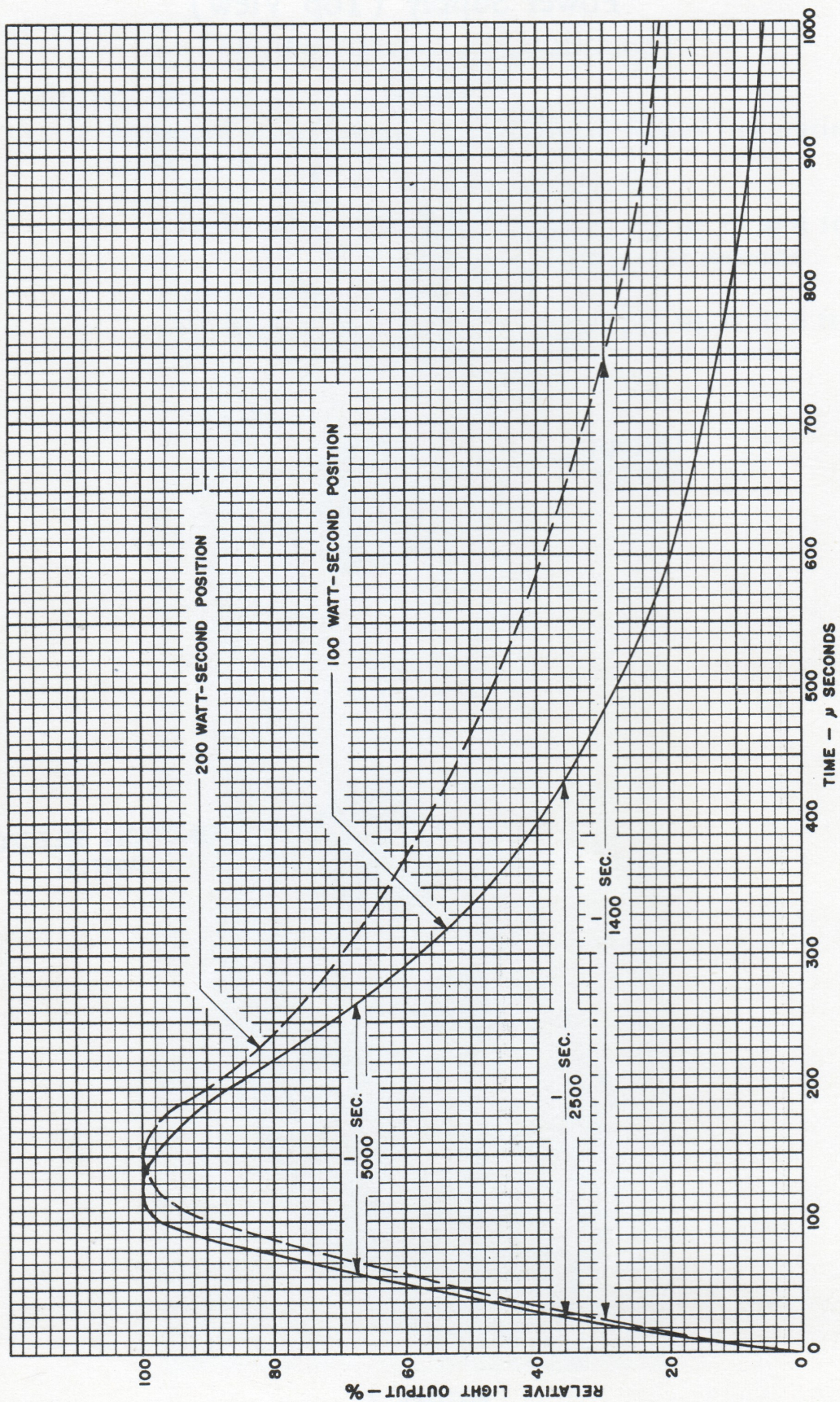
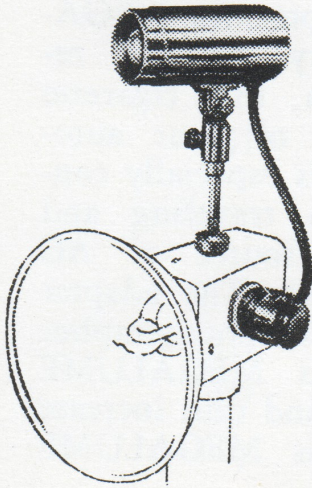


FIGURE 9 -LIGHT DURATION CURVES FOR MEGALUME II

Megalume Accessories

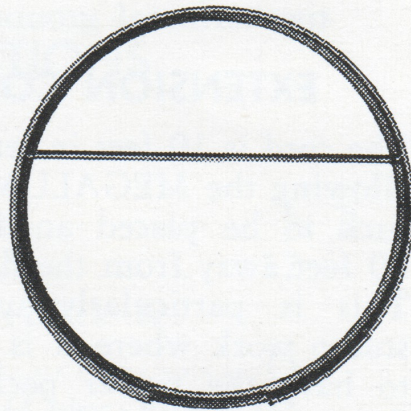
MEGATRIPPER



This slave unit provides remote synchronized firing of an additional MEGALUME. It operates on the light output of the MEGALUME that is fired by the camera shutter thus requiring no interconnecting cables. The MEGATRIPPER has been designed to operate in a high level of ambient light both in the studio and/or short distances outside. It mounts simply on the slave MEGALUME lead in a socket designed for the purpose and can be aimed at the master light or to the subject for reflected light operation. Any number of additional MEGALUMES may be used in multiple flash if each is equipped with a MEGATRIPPER.

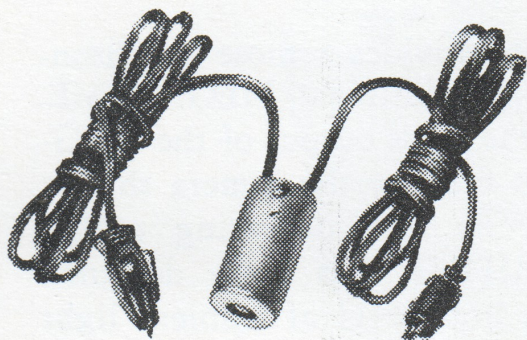
FILTER HOLDER

Used to support a 5½ inch filter in front of the MEGALUME flash head, the filter holder has been especially designed for the critical worker who does not wish to reduce the definition of his pictures by adding a filter to his lens. Useful in obtaining special effects in multiple flash with different color filters. It is also quite useful in color photography outdoors when the MEGALUME is used to supplement daylight. In the latter case, a color correction filter is installed on the flash head to match its color quality to that of daylight.



Megalume Accessories

CHARGING ADAPTER



With this adapter, the MEGALUME battery can be recharged from the cigarette lighter outlet of your automobile. This is especially convenient when traveling and there is no source of AC power available. The adapter also allows the photographer to charge his MEGALUME

battery while traveling to or between jobs, and thus increase the number of flashes available from his MEGALUME in one day.

Since there are four classes of battery systems in use in American cars, the following four models of the charging adapter are available.

Model 6N—for cars with a 6 volt battery and the negative terminal grounded.

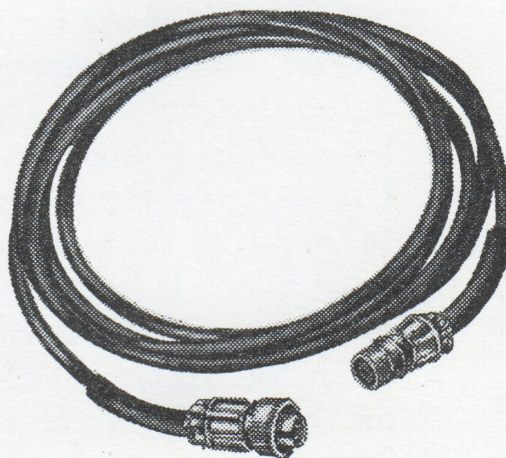
Model 6P—for cars with a 6 volt battery and the positive terminal grounded.

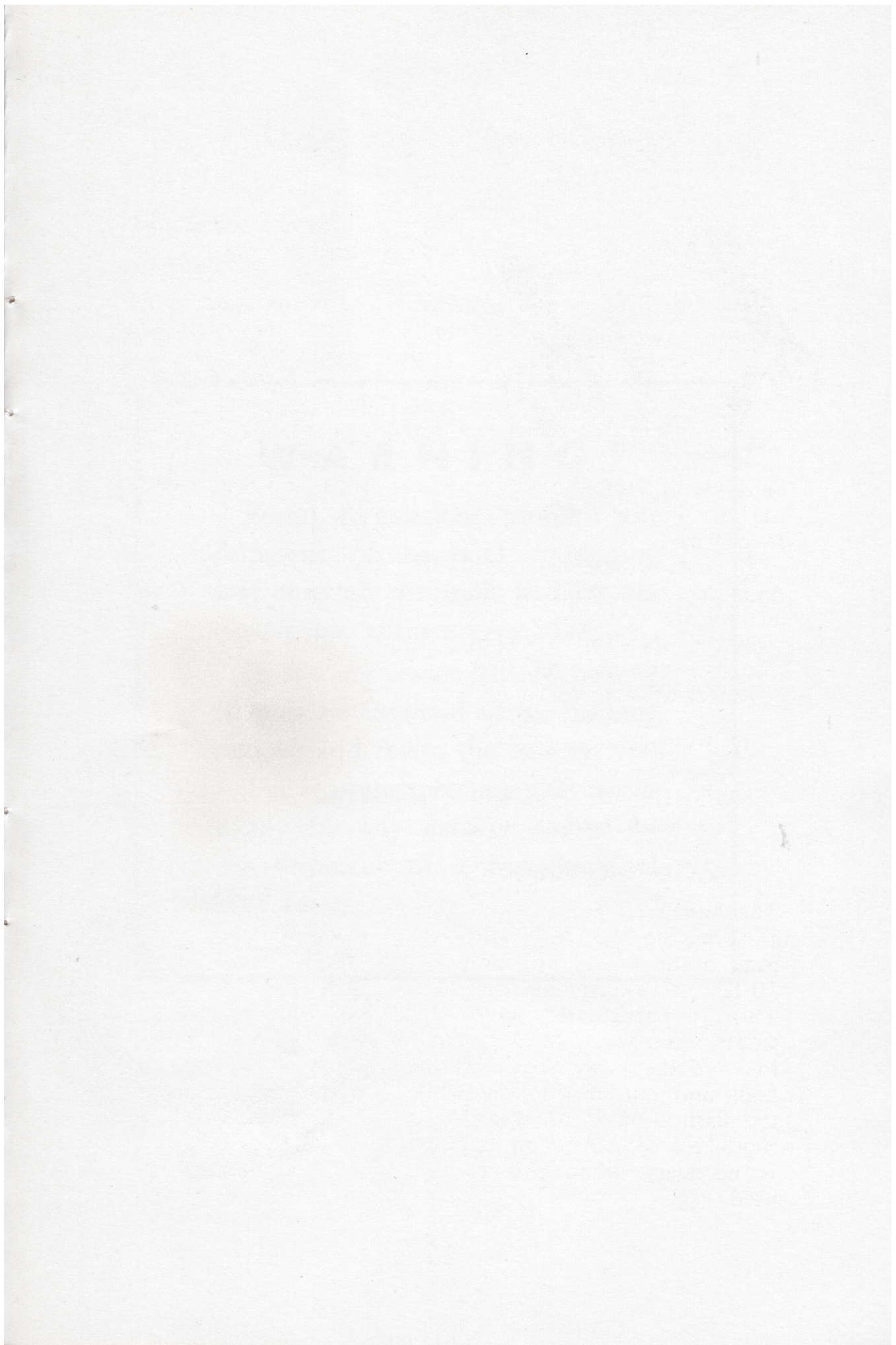
Model 12N—for cars with a 12 volt battery and the negative terminal grounded.

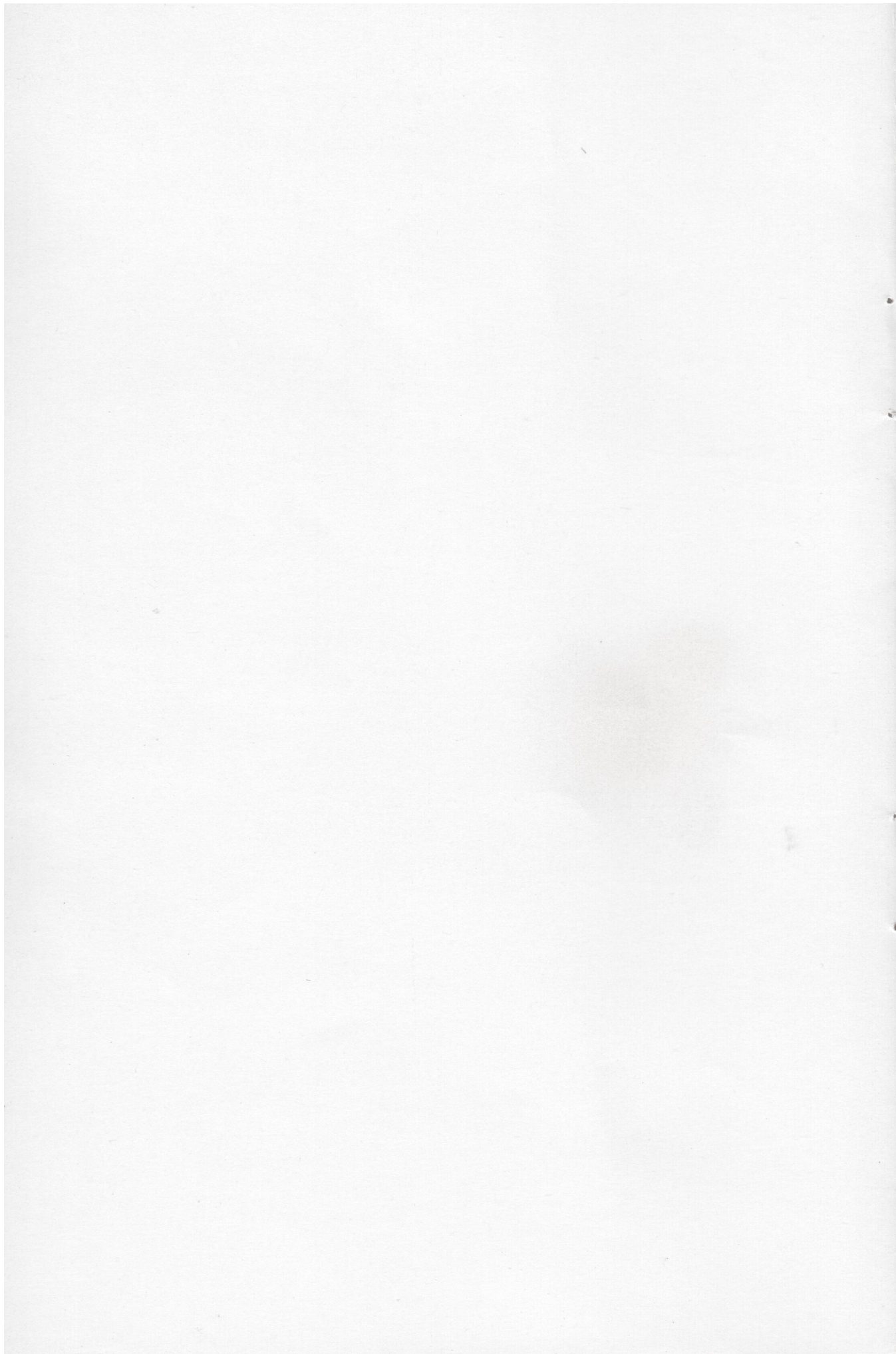
Model 12P—for cars with a 12 volt battery and the positive terminal grounded.

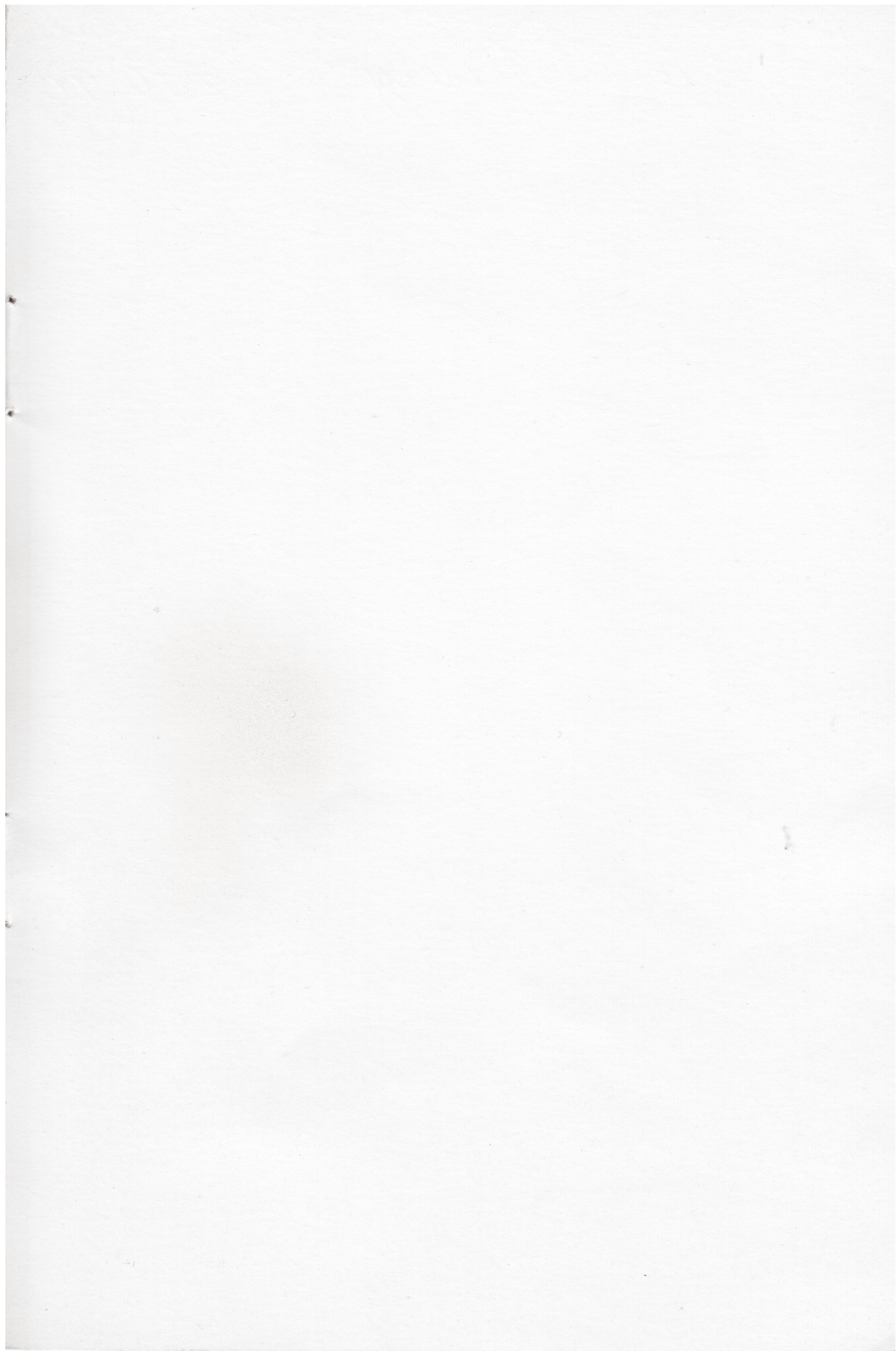
EXTENSION CORD

The cord is 10 feet in length thus allowing the MEGALUME power pack to be placed an additional 10 feet away from the flash head. This is particularly useful for studio work where it is desirable to have the power pack on the floor and out of the way while the flash head is mounted on a stand. No adjustment in exposure is necessary when this cord is used.









Complete, less battery

List Price
\$256.90